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MINING OPERATIONS BY LESSEES
AMERICAN ZINC, LEAD AND SMELTING COMPANY
MISSOURI PORTION, TRI-STATE DISTRICT

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I. INTRODUCTION

General Statement. -- This report has been prepared to describe the mining properties owned, or leased, by the AZL&S Company in the Missouri Portion of the Tri-State district, that were leased, or subleased, to other mining organizations. Such farm-out arrangements were confined to (1) those lands that contained small, short-lived ore deposits, (2) clean-up and gouging operations at depleted mines, and (3) those areas where mining operations required a pooling of interests for a major mine development. A review of the company's activities shows a total of 11 properties that supported lessee operations. These included four tracts of leased land aggregating 392 acres, and seven tracts of fee-land aggregating 8,611 acres. The total tonnage mined from these properties is estimated to have been about 29,079,000 tons of crude ore, of which about 6,660,000 tons were mined during the periods the land rights were held by AZL&S Co.

Character of Mining. -- Zinc and lead mining in southwestern Missouri, except for the sheet-ground deposits of the Duenweg-Webb City-Oronogo trend, was from 24 scattered subdistricts, each containing many small, disconnected, pocket-like ore deposits. Because of the inherent low grade of ore, averaging less than three percent as combined zinc and lead metal, mine production was very cyclical, being tied to the ups and downs of the metal markets. The average life of a moderate-sized ore deposit ranged from three to five years. In order to survive under such conditions mining tracts were often leased, subleased, assigned, bought, and sold over and over again. The only periods of sustained profitability were those years of war-time prices during the Spanish-American War, World War I, World War II, and the Korean Conflict.

Land Holdings. -- The mining properties of the area were originally acquired through lease or purchase agreements from the local landowners, by a multitude of mine operators, property developers, promoters, and speculators. The AZL&S Company entered the district in 1899, being sold on the area's opportunities by a local promoter, who had assembled 21 scattered land parcels containing 2,403 acres of fee-land, and 457 acres of mining leases. The original concept was to develop these properties for royalty income, by leasing or subleasing to other mining groups. Since most of the acreage was unsuited for shallow mining, the original plans were abandoned in 1904 in favor of the company developing and mining the lower-ground ore deposits for its own account. By 1911 most of the poorly productive tracts had been either sold, or surrendered.

The policy of only acquiring lands for its own needs was continued until 1916, when the company purchased the Granby Mining and Smelting Co., the largest mining organization in southwestern Missouri. This company had been in business since 1865, and owned large acreages of mostly shallow ore deposits, which were leased to smaller companies to supply concentrates to its lead and zinc smelters. All mining was entirely from hundreds of lessees, who were supplied necessary mining, milling, and pumping equipment in return for a percentage of the production values. The land holdings conveyed by the Granby company included the Granby Lands (6,000+ acres), the Joplin Lands (960 acres), and the Oronogo Lands (1,236 acres). This acquisition placed the AZL&S Company back into the business of leasing mining lands to others.

Lessee Mine Production. -- Mine production from lessees on lands with which the AZL&S Company had some involvement covers a time span ranging from 60 to 100 years. All of these properties were in various stages of development at the time of their acquisition by the company, and in some instances a number of the properties were significantly mined ~~mined~~ by other companies after they were surrendered or sold by AZL&S Company. The continuity

of mining on these tracts was rather complex, but an effort has been made to break down the production estimates by operational periods, so as to show the tonnages mined by the various operators.

Production figures are only partially available, being recorded in old State and Federal reports, newspaper microfilms, and in company reports in the writer's files. The statistical information from the newspaper microfilms, and from most of the State and Federal reports is in the form of concentrates sold, which has been converted to tonnages mined by using concentration ratios considered appropriate. For some of the properties, particularly Oronogo, actual mine tonnage figures for the 1916 to 1947 period were available.

In compiling this information serious problems arose, consisting of gaps in reported production, and to cases where mine output was consolidated with other properties not connected to the AZL&S Company. Wherever such discrepancies occurred, they were adjusted by using calculated production averages. While it was impossible to reconstruct the actual mine tonnages, it is believed that figures presented below are reasonably accurate, and should be satisfactory for the purpose desired.

A list of information sources used is as follows:

1. Missouri Geological Survey, Reports for years 1855, 1873, and 1894.
2. Missouri State Mine Inspector, Annual Reports 1895 to 1915.
3. Newspaper Files, Joplin Globe, and Joplin News Herald.
4. U. S. Bureau of Mines, Summarized Production Statistics for Tri-State District, Information Circular No. 7383, November 1946.
5. Legett and Hellmann Report on AZL&S Company, 1911.
6. Personal Files, Misc. Property Reports, and Old Mine Maps.

Table 1

ESTIMATED MINE PRODUCTION
AZL&S LEASED AND FEE LANDS -- MINED BY OTHERS
MISSOURI PORTION, TRI-STATE DISTRICT

<u>PROPERTY</u>	<u>ACRES</u>	<u>AZL&S PERIOD</u>	<u>EST. AZL&S LESSEE TONS</u>	<u>EST. TOTAL TONS MINED</u>
<u>(Leased Lands)</u>				
1. Center Valley	167	1899-1904 (?)	100,000	948,000
2. Cornfield	80	1899-1909	180,000	860,000
3. Midway Lease	80	1899-1909	20,000	25,000
4. Mo. Central	50	1899-1909 (?)	6,000	10,000
<u>(Fee Lands)</u>				
5. Interurban	40	1899-1921	15,000	20,000
6. Midway Fee	200	1899-1918	245,000	250,000
7. Porter	160	1899-1921	18,000	20,000
8. Richland (1)	30	1899- (?)	100,000	213,000
9. Granby	6,000+	1916- 1925	1,166,000	12,767,000
10. Joplin	960	1916- 1969	526,000	5,310,000
11. Oronogo	1,236	1916- 1974	4,284,000	8,656,000
<u>TOTALS</u>	<u>9,003</u>		<u>6,660,000</u>	<u>29,079,000</u>

NOTES: All of the above tonnage figures rounded to nearest 1,000 tons.

(1) AZL&S Company owned an undivided 50 percent interest.

A description for each of the above properties follows:

(Maps showing location of above properties are appended)

II. PROPERTIES MINED BY LESSEES

1. Center Valley Tract

Location and Area. -- This property consisted of three contiguous mining leases, totaling 166.5 acres, lying in the Center Creek bottoms about midway between Webb City and Oronogo. The acreage included the Baker lease (43 acres), being the N $\frac{1}{2}$ of the W $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Sec. 6, T28N, R32W; the Hendrickson lease (43.5 acres), being the S $\frac{1}{2}$ of the W $\frac{1}{2}$ of the SW $\frac{1}{4}$ of Sec. 6, T28N, R32W; and the Carter lease (80 acres), being the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$, and the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 1, T28N, R33W. These tracts were part of the original 1899 land acquisition. (See Fig. 1)

Mining History. -- Geologically this area contained two upper ground filled-sink structures with shallow pockets of ore occurring in the first 125-foot interval, and a lower ground zone of ore below the 175-foot level. Mining of the shallow ore commenced in 1892 by the Center Valley Mining Co., but yields were small with the area being flooded by frequent overflows from Center Creek. Drill hole prospecting after 1899 by the AZL&S Co. discovered the deeper sheet-ground ore, but decided against development due to the heavy underground water encountered. Court House records do not show when these leases were surrendered, but it is believed to have been in about 1904. During later years, prior and during World War I, this acreage was acquired and dewatered by other companies to mine the sheet-ground ores. These companies included the Vantage, Red Dog, Bull Dog, and D. C. & E., all of whom mined large tonnages until about 1921, when declining metal prices forced the mines to close. Following the end of this mining the ground became flooded, but was dewatered again in 1939 by the Eagle-Picher Co., and the Metals Reserve Co., for possible operation during World War II. This effort came to an untimely end in 1943, when Center Creek again broke into the mine workings. The underground has remained flooded to the present time.

Mine Production. -- Mine production figures for these leases were obtained from sporadic data in the State Mine Inspector Reports, covering the early upper-ground mining, and from mine map calculations for the deeper sheet-ground mines. Mining during the pre-1908 (?) years was entirely from the shallow ore deposits, with as many as 12 small operators working at any one time. The development of the deeper sheet-ground mines did not begin until about 1908 (?), when mine pumping dewatered the lower ground. Sheet-ground mining expanded rapidly, reaching peak production during World War II, and consisted of four large room and pillar mines having considerable lateral extent.

A summary of the estimated tonnage produced, by operating periods, is shown in the following table:

<u>Estimated Production</u>			
<u>Center Valley Tracts</u>			
<u>Period</u>	<u>Property Owners</u>	<u>Lessee Operator</u>	<u>Estimated Tons Mined</u>
1892 - 1899	Baker, Carter, & Hendrickson	Various Lessees	40,000
1900 - 1904	"	AZL&S Co.	100,000
1905 - 1908(?)	"	Various Lessees	40,000
1909(?)-1921(?)	(?)	Vantage Mine	50,000
" "	"	Red Dog Mine	200,000
" "	"	Bull Dog Mine	183,000
" "	"	D.C.&E. Mine	335,000
<u>Total Estimated Production</u>			<u>948,000</u>

2. Cornfield Tract

Location and Area. -- This tract comprised an 80-acre mining lease lying on the southern edge of Cartersville, and was a portion of the original land acquisition of 1899. It was situated in the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 17, and the NW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 20, T28N, R32W. This land parcel lies in one of the older mining areas, and contained both shallow, upper-ground ore deposits, and deeper sheet-ground mineralization in its southern and western portions, (See Fig. 2)

Mining History. -- Mining operations in this area commenced in about 1887, as part of a 240-acre tract owned by Messrs. W. A. Daugherty, T. N. Davey, and J. A. Daugherty. During the first ten years of mining all production was from a number of small lessee groups, who worked the upper ground levels. In about 1897 the lower ground sheet-ground ores were discovered, and pumping was started to develop this zone. In 1899 the tract was subdivided, with the Cornfield-80 being leased to the AZL&S Co. All production records up to this time were reported for the entire 240-acre ownership.

During the next six years the upper and lower ground ores vigorously mined by as many as 11 sublessee groups operating on agreements from the AZL&S Co. When this lease was surrendered is not known as no record can be found at the Court House, but the date is believed to have been about 1905. Following the termination of all these leases, the property was mined by other lessees until about 1910, when all mining in this area generally ceased. The last mining companies that operated on this tract were the Cornfield Mining Co., the Fullerton Mining Co., the Virginia Mining Co., and the Old Virginia Mining Co.

Mine Production. -- Production records for the Cornfield-80 are almost impossible to piece together, with the pre-1899 figures being consolidated with a larger land parcel, and with

only partial data being available thereafter. For this report the total mine production has been derived by volumetric calculations from the underground mine, using an average ore thickness of 11 feet. For the six years of subleasing by the AZL&S Co. an average annual mine tonnage of 30,000 tons was used.

A summary of the estimated tonnage produced, by operating periods, is shown in the following table:

<u>Estimated Production</u>			
<u>Cornfield Tract</u>			
<u>Period</u>	<u>Property Owners</u>	<u>Lessee Operator</u>	<u>Estimated Tons Mined</u>
1883 - 1893	Daugherty, Davey, & Daugherty	Various	190,000 (1)
1900 - 1903(?)	"	AZL&S Co.	180,000 (2)
1906(?) - 1920(?)	(?)	Garnet)	
"	"	Fullerton)	
"	"	Cornfield)	490,000 (3)
"	"	Old Virginia)	
			<u>850,000 (4)</u>

TOTAL

3. Midway Lease Tract

The Midway Lease was an 80-acre land parcel situated four miles northwest from Joplin, and was a part of the original 1899 land acquisition. The tract is described as being the $W\frac{1}{2}$ of the $NE\frac{1}{4}$ of Sec. 31, T28N, R32W. The mineralization here was very poor, consisting of a small area of upper ground breccia lying near the center of the south forty. Mining was limited to small-scale, sublessee operators who worked the ground to depths of 157 feet. Peak production was apparently during the 1902-1905 period, when four sublessees produced 875 tons of concentrates, or about 3,000 annual tons of mine ore. With no worthwhile ore discoveries being made, mining operations gradually ceased. The date this lease was surrendered is not known, but it is assumed to have been around 1909. (See Fig. 6)

Total mine production is estimated to have been around 25,000 tons, with the output during the AZL&S lease years being about 20,000 tons.

4. Missouri Central Tract

This tract was a 50-acre mining lease located in the Central City area, about four miles west from Joplin, and was a portion of the original 1899 land acquisition. The property is described as being the West Fractional one half of the $SW\frac{1}{4}$ of Sec. 6, T27N, R33W. The ore deposits here were small insignificant occurrences lying on the southern part of the property, and were mined by various sublessees to depths of 129 feet, with the principal operation being that of the Ben B. Mining Co. Peak production was apparently between the years of 1901 to 1903, when some 6,000 tons of crude ore were mined. The surrender date of the lease is not known, but is presumed to have been about 1909. (See Fig. 3)

Total mine production is estimated to have been 10,000 tons, of which 6,000 tons has been assigned to the AZL&S lease years.

5. Interurban Tract

This property consisted of 40-acres of fee land lying in the Central City area, approximately four miles west from Joplin. This land comprised the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Sec. 7, T27N, R33W, and was part of the original 1899 land acquisition by the company. The mineralization consisted of small, erratic upper ground ore occurrences, associated with poorly developed collapse structures. Mining was confined to many shallow prospect shafts, one of which was the infamous Yellow Rose mine, where the company tried its first mining venture at a great loss of both face and money. Production records are scant, but the State Mine Inspector Reports show a total of 761 tons of concentrates as being produced during the years 1901 through 1906. Some unproductive mining and prospecting attempts were made in later years, but the property was finally sold on March 2, 1921 to Mr. O. F. Freeman. (See Fig. 3)

Total mine production has been estimated at 20,000 tons, of which about 15,000 tons were mined during AZL&S ownership.

6. Midway Fee Tract

The Midway fee acreage consisted of 200 acres lying four miles northeast from Joplin, at a point about midway between Webb City and Joplin. This land parcel was part of the 1899 land acquisition, and covered the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$, the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$, and the S $\frac{1}{2}$ of the SE $\frac{1}{4}$ of Sec. 31, T28N, R32W; plus the NE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Sec. 2, T27N, R33W. The mineralization here was confined to the upper ground ore occurrences, collapsed structures, four of which included the famous Yellow Rose mine. Only three of these structures were large enough to sustain consistent mine production from ore zones lying between the depths of 78 to 157 feet. Mine production from several lessee operations began in about 1902, and continued intermittently through the World War I years, with the principal producers being the New Dividend Mining Co., and the Movakan Mining Co. This acreage was sold on October 29, 1917, and on January 17, 1918 to Mr. L. P. Buchanan, a Joplin mine operator. (See Fig. 4)

Total mine production has been estimated at 250,000 tons, of which 245,000 tons were produced during the AZL&S ownership period.

7. Porter Tract

The Porter tract consisted of 160 acres of fee land lying in the Central City area, located four miles west from Joplin. This property was part of the original 1899 land acquisition by the company, and comprised the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$, the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$, the SW $\frac{1}{4}$ of the NE $\frac{1}{4}$, and the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Sec. 7, T27N, R33W. Geologically the tract was largely an area of poorly altered cherty limestone, containing small scattered zones of collapsed breccias in its southern and northwestern portions. The mineralization was very spotty, and consisted of small pockets of ore lying from 30 to 80 feet in depth. Although the altered areas are pock-marked by prospect shafts, no worthwhile ore discoveries were made. The company maintained its ownership until March 2, 1921, when it was sold to Mr. O. F. Freeman. (Fig. 3)

Total mine production has been estimated at 20,000 tons, of which about 18,000 tons were produced during the years of ownership by the AZL&S co.

8. Richland Tract

Location and Area. -- The Richland tract was a 30-acre land parcel lying one mile south from Carterville, and was situated in one of the more productive mining areas. A 50 percent, undivided fee ownership, plus a mining lease on the unowned portion, were obtained by the AZL&S Co. as part of the 1899 land acquisition package. The property was described as being the western three-quarters of the SW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Sec. 21, T28N, R32W. The ore deposits here included both upper and lower ground mineralization, with mining operations being conducted on the 95, 105, 168, and 180 foot levels. During the years of AZL&S Co.'s control, all mining was performed by either lessees or sublessees. (See Fig. 2)

Mining History. -- Mining on this tract commenced in 1891 with the upper ground ores being worked on the 95-foot level. In about 1892 a portion of the property was leased to the Richland Mining Co., who operated, along with other lessees, until 1899. In that year the AZL&S Co. acquired its 50 percent ownership and lease to the unowned portion, and continued to sublet the mining rights to various small mining companies. In 1912 the company surrendered its mining lease, and granted a mining lease to the owned portion to Mr. L. F. Hatcher, the owner of the other one half interest. Hatcher continued to mine the tract through lessees until about 1918, when mining generally ceased in this area. On March 12, 1929 the company sold its one half undivided interest to Mr. E. P. Hatcher.

Mine Production. -- Since mining on this tract was entirely from many lessees and sublessees, mine production records were very incomplete. For this report the estimated tonnage mined was calculated from volumetric measurements of the mined areas as shown on old company maps. These tonnage figures have been broken down into periods relating to the operating lessors. A tabulated summary of the estimated mine production, by operating periods, is as follows:

<u>Estimated Production</u>			
<u>Richland Tract</u>			
<u>Period</u>	<u>Property Owner</u>	<u>Lessee Operator</u>	<u>Estimated Tons Mined</u>
1891-1892	Richland Mining Co.	Various	10,000
1893-1899	E. P. Hatcher	Richland et al	56,000
1900-1912	AZL&S Co.	Various	100,000
1913-1918	(Leased to Owners)	"	47,000
<u>Total Estimated Production</u>			<u>213,000</u>

9. Granby Lands

Location and Area. -- The Granby lands comprised a large block of acreage centering around the town of Granby, Newton Co., Missouri. This area lies 24 miles southeast from Joplin, and 7 miles northeast from Neosho. From shortly after the date of the original ore discoveries in 1850, and until 1916, this mining area was dominated by the Granby Mining and Smelting Co., who acquired control to more than 12,000 acres in this vicinity. The known ore deposits, however, were confined to approximately 1,320 acres lying within two miles of the town site. This area consisted of 240 acres in Sec. 1, 360 acres in Sec. 12, T25N R31W; and 560 acres in Sec. 6, 160 acres in Sec. 7, T25N R30W. Most of the mining was from a widespread area of shallow, upper ground ore occurrences, with the lower ground ores being confined to the southern portion, and limited in extent. (See Fig. 5)

Mining History. -- The Granby area was one of the oldest and the third most productive mining center in the district, being discovered in 1850. Small scale mining was pursued until 1856, when the principal mining area was leased to the Blow and Kennett Co. of St. Louis, Mo. These people erected a lead smelter, encouraged production from sublessees, and operated until 1861, when the Civil War halted all mining. After the War in 1865 the Granby Mining and Smelting Co. was organized, absorbing the interests of Blow and Kennett. Following this take-over the Granby Co. modernized the mining and smelting facilities, and subdivided the mining area into 200-foot square lots for leasing purposes. The Granby Co. did no mining for its own account, but engaged solely in subleasing to many small mining groups.

After managing these mines for more than 60 years, the Granby Co. sold its holdings on June 2, 1916 to the American Zinc, Lead and Smelting Co. For a short period from 1916 to 1919 the AZL&S Co. operated the Klondike, Mascot, and Golder Rule mines for its own account, but also continued the mine leasing policy of the

Granby Co. In August 1925 the AZL&S Co. leased all of the Granby lands to the Federal Mining and Smelting Co. (Asarco), who in September 1930 purchased this property, with the exception of the abandoned lead smelter. The lands conveyed were reported to have totaled some 6,000 acres, with some of the outlying property either being previously sold, or was retained by the AZL&S Co.

Mine Production. -- The Granby area had a productive life of more than 96 years, with the principal production coming from many shallow mines lying within 100 feet of the surface. Because of the near surface nature of the ore deposits about one half of the concentrates produced were oxidized minerals, such as lead and zinc carbonates, and zinc silicates. Since complete production records are unavailable, the mine output has been estimated using average annual tonnages obtained from old reports and newspaper files. The production figures shown below have been subdivided into historical operating periods, and are considered to be reasonably accurate.

Estimated Production

Granby Lands

<u>Period</u>	<u>Property Owner</u>	<u>Lessee Operator</u>	<u>Estimated Tons Mined</u>
1851-1861	A&P Railroad	Blow & Kennett et al	610,000
1862-1864	(Civil War)	None	- -
1865-1892	Granby M&S Co.	Various	4,665,000
1893-1904	" "	"	1,879,000
1905-1916	" "	"	3,381,000
1917-1924	AZL&S Co. (1)	"	1,166,000
1925-1941	Federal M&S Co.	Federal M&S Co. (2)	445,000
1942-1947	" "	" "	621,000
<u>Total Estimated Production</u>			<u>12,767,000</u>

- Notes: (1) Operated Klondike, Mascot, and Golden Rule mines during 1916-1919 period.
- (2) Leased property in 1925 and purchased it in 1930. Federal M&S Co. was a subsidiary of Asarco.

10. Joplin Lands

Location and Area. -- The Joplin lands comprised a mostly contiguous block of acreage lying on the south side of Turkey Creek, and along both sides of the northwestern boundary of the City of Joplin. This area contained the site of the pre-Civil War Turkey Creek Mining Camp, and was acquired in 1916 through the purchase of the Granby Mining and Smelting Co. These land holdings originally contained 960 acres of fee-land, which had been reduced to 830 acres at the time it was sold to the AZL&S Co. Through subsequent land sales the property contained only 590.48 acres in 1969, when it was finally divested. The original Granby Co.'s property included 440 acres in Sec. 33, and 280 acres in Sec. 34, T29N, R33W; plus 96 acres in Sec. 3, and 144 acres in Sec. 4, T28N, R33W, or a total of approximately 24 forty acre parcels. The mineralization consisted entirely of shallow and upper ground ore deposits having limited extent, both horizontally and vertically. The surface area is literally dotted with hundreds of old shaft sites. (See Fig. 4)

Mining History. -- The property contains the site of the original 1848 ore discovery in the Joplin district, and was mined by early prospectors from 1848 to 1860, with mining being abandoned during the Civil War years 1861 through 1864. In 1869 the Granby Co. entered the area, and over the next few years purchased the fee-ownership to 960 acres. At that time the entire property was subdivided into 200-foot square mining lots, which were leased to small mining groups. The Granby Co. did no mining for its own account, but operated pumps, prospecting drills, and in 1877 constructed a modern milling and smelting facility, which ran for a number of years. Mine production gradually expanded, reaching 200,000 annual tons during the 1901 to 1916 period. Well known lessee operations included the Blackberry, Royal Blue, B. & H., Grace, Cliff, Omega, Katty Lou-Postal, O.K. Roof, Amalgamated, and Monitor Mining Companies. On June 2, 1916 the Granby M.&S. Co. was sold to the AZL&S Co.

Mine Production. -- Mining operations on the Joplin Lands covered a period of more than 100 years, with production figures being limited to occasional references in old reports and newspaper files. In order to prepare a meaningful estimate for mine production from a property where the mining was done by dozens of small producers, the use of the newspaper files was abandoned as too time consuming. Instead, the productive life of the area was broken down into eight operating periods where intermittent production figures were available. By using annual mine tonnage averages for each operating period, a production summary has been reconstructed. As a check on these figures volumetric measure-
ments were made from old mine maps of the eleven hard-ground mines on the property. These calculations showed a total of 2,800,000 rock tons, which when doubled to account for the many shallow, soft-ground mines, yielded a total production of 5,600,000 tons. This tonnage compares very closely to the figure derived from annual production averaging.

A summary of the estimated tonnage produced, by operating periods, is shown in the table below.

Joplin Lands		Total Estimated Production	
Property	Period	Tons Mined Per Year	Estimated Tons Mined
Omnet	1848-1860	500	6,500
Tangle et al	1861-1865	500	2,500
Omnet	1866-1870	500	475,000
Omnet	1871-1885	500	1,100,000
Omnet	1890-1900	500	3,200,000
Omnet	1901-1910	500	500,000
Omnet	1917-1921	500	25,000
Omnet	1922-1927	500	25,000
Omnet	1928-1930	500	25,000
Omnet	1931-1935	500	25,000
Omnet	1936-1940	500	25,000
Omnet	1941-1945	500	25,000
Omnet	1946-1950	500	25,000
Omnet	1951-1955	500	25,000
Omnet	1956-1960	500	25,000
Omnet	1961-1965	500	25,000
Omnet	1966-1970	500	25,000
Omnet	1971-1975	500	25,000
Omnet	1976-1980	500	25,000
Omnet	1981-1985	500	25,000
Omnet	1986-1990	500	25,000
Omnet	1991-1995	500	25,000
Omnet	1996-2000	500	25,000
Omnet	2001-2005	500	25,000
Omnet	2006-2010	500	25,000
Omnet	2011-2015	500	25,000
Omnet	2016-2020	500	25,000
Omnet	2021-2025	500	25,000
Omnet	2026-2030	500	25,000
Omnet	2031-2035	500	25,000
Omnet	2036-2040	500	25,000
Omnet	2041-2045	500	25,000
Omnet	2046-2050	500	25,000
Omnet	2051-2055	500	25,000
Omnet	2056-2060	500	25,000
Omnet	2061-2065	500	25,000
Omnet	2066-2070	500	25,000
Omnet	2071-2075	500	25,000
Omnet	2076-2080	500	25,000
Omnet	2081-2085	500	25,000
Omnet	2086-2090	500	25,000
Omnet	2091-2095	500	25,000
Omnet	2096-2100	500	25,000
Omnet	2101-2105	500	25,000
Omnet	2106-2110	500	25,000
Omnet	2111-2115	500	25,000
Omnet	2116-2120	500	25,000
Omnet	2121-2125	500	25,000
Omnet	2126-2130	500	25,000
Omnet	2131-2135	500	25,000
Omnet	2136-2140	500	25,000
Omnet	2141-2145	500	25,000
Omnet	2146-2150	500	25,000
Omnet	2151-2155	500	25,000
Omnet	2156-2160	500	25,000
Omnet	2161-2165	500	25,000
Omnet	2166-2170	500	25,000
Omnet	2171-2175	500	25,000
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11. Oronogo Lands

Location and Area. -- These lands were situated nine miles northeast from Joplin, and consisted of 1,236 acres of fee-land and mineral rights covering most of the town of Oronogo and surrounding areas. This acreage was assembled by the Granby Mining and Smelting Co. soon after 1865, and embraced the major portion of the known ore deposits at Oronogo, with the exception of one forty lying within the town area. The land holdings included 600 acres in Sec. 36, T29N, R33W; 210 acres in Sec. 31, T29N, R32W; 140 acres in Sec. 1, T28N, R33W; 240 acres in Sec. 2, T28N, R33W; and 46 acres later sold. Oronogo was one of the most productive mining areas in the district, with the ore deposits extending from the surface downward to below 250 feet, and covering more than 320 acres in lateral extent. The area is best known as the site of the famous Oronogo Circle Mine, which during the 1940's was the largest open-pit zinc-lead mine in the world. (Fig. 1)

Other important mines on the property included the Pinnacle, Schoolhouse, La Tosca, Sacred Nugget, and Needmore.

Mining History. -- The Granby Co. entered this area in 1865, and acquired a large land position covering the sites of the pre-Civil War ore discoveries. The lands purchased were subdivided into 200-foot square mining lots, with leasing to small mining groups being encouraged. This company did not engage in mining itself, but assisted in the development of the area through prospect drilling, mine pumping, and equipment rental. The shallow ground mining from many lessees showed a consistent growth through 1897, after which mining boomed with the dewatering of the lower sheet-ground levels. The years 1898 through 1916 were a period of consolidation wherein the small lessees merged into larger mining companies, with combined production averages rising to 200,000 tons per year. On June 2, 1916 the land holdings of the Granby M. & S. Co. were purchased by the AZL&S co.

All mining operations under the AZL&S Co.'s ownership were continued on the same basis as before, but production declined rapidly following the drop in metal prices after World War I. By 1923 the sheet-ground mining became unprofitable, and the mines closed with the ground filling with water. However during this period, in 1917, one of the larger lessees, the Connecticut Zinc Co., started the stripping of the Oronogo circle, and after seven years of work had to abandon the project after suffering a loss of 1.8 million dollars. From 1924 to 1935 the mines remained flooded, with ore production being limited to a few shallow gouging operations.

In 1934 a Central Drainage District of Jasper County was established by an Act of the Missouri Legislature to govern the dewatering of the lower ground ore deposits along the ten mile trend of the Duenweg-Webb City-Oronogo mining field. This mine pumping project was financed by a consortium, which included the Mid-Continent Lead and Zinc Co. (Childress' Interests), and the Eagle-Picher Co. As a part of this undertaking the AZL&S Co. leased the Oronogo lands on January 1, 1935 to Mr. Frank Childress, who shortly thereafter assigned these rights to the Eagle-Picher Co. Later on July 8, 1946 the zinc company granted a new lease to the Eagle-Picher Co.

Mine pumping along the sheet-ground trend was commenced in January 1935, and by July 1936 the water in the Webb City-Oronogo mines had been drained. In 1935 the Childress' granted a sublease on the Oronogo circle to the Oronogo Mutual Mining Co., who resumed the stripping of the ore deposit. In 1937 a sublease was granted to the Harris and Martin Mining Co. to mine the upper ground ore on the lower level, and in 1940 a sublease was granted to the Harris and Martin Mining Co. to mine the sheet-ground ore on the Schoelkopf, La Fosca, Pinnacle, and Granby 3rd Add. forties. In addition the Eagle-Picher Co. reopened and operated the Needmore mine from 1946 through 1947. The dewatering of this area proved to be very rewarding, with the combined production from

these operations, from 1935 to 1947, amounting to more than 40 percent of the total mine output from 1851 to 1934. All mining in the area ceased in 1947 when the government sponsored Premium Price Plan expired, with the mines again becoming flooded with water, and have remained so to the present time.

Following the end of mining the Eagle-Picher Co., Fenix and Martin Co., and the Fenix and Sons Co. removed their mining equipment. The Oronogo Mutual Mining Co. remained in business for a few years screening and selling mill tailings, but in 1955 it sold its mining and property assets to the Fenix and Scisson Co. of Tulsa, Okla. The Fenix and Scisson Co. is a contracting firm that mines underground storage facilities for liquidfied petroleum products, and is still in business. On October 25, 1974 the AZL&S Co. sold all of its fee-land and mineral rights in this area to Mr. Carl E. McDonald, a Joplin real estate developer.

Mine Production. -- Oronogo was the fourth largest mining subdistrict in southwestern Missouri, having produced in excess of 5.5 million tons of ore. The production figures from 1851 to 1916 are only partially available, being disseminated in early State Geological and Mine Inspector Reports, and during later years in newspaper files. However the production records from 1917 to 1947 are complete, being preserved in old AZL&S Co. files in the possession of the writer. For this report estimates for the pre-1917 production have been made by annual production averages for each of the various mining periods as identified from the mining history. Added to these figures were the actual post-1917 records, compiled by lessees. To serve as a check on the estimated production figures, volumetric measurements were made from former mine maps showing the underground workings. These calculated tonnages compare very closely with the results derived from the annual production averaging.

A summary of the estimated tonnage produced, by operating periods and lessees, is shown below.

Estimated Production

Oronogo Lands


<u>Period</u>	<u>Property Owner</u>	<u>Lessee Operator</u>	<u>Estimated Tons Mined</u>
1851-1860	White, Conovy, & Chenault	Various	42,000
1861-1864	(Civil War)	None	- -
1865-1875	Granby M&S Co.	Various	110,000
1876-1885	" "	"	150,000
1886-1897	" "	"	240,000
1898-1908	" "	"	2,200,000
1909-1916	" "	"	1,600,000
1917-1923	AZL&S Co. (1)	Conn. Zinc et al	769,000
1924-1938	"	Various (Flooded)	39,000
1935-1947 *	"	Oronogo Mutual Co.	2,828,000
1837-1947 *	"	Fenix and Others	598,000
1946-1947 *	"	Eagle-Picher	80,000
<u>Total Estimated Production</u>			<u>8,656,000</u>

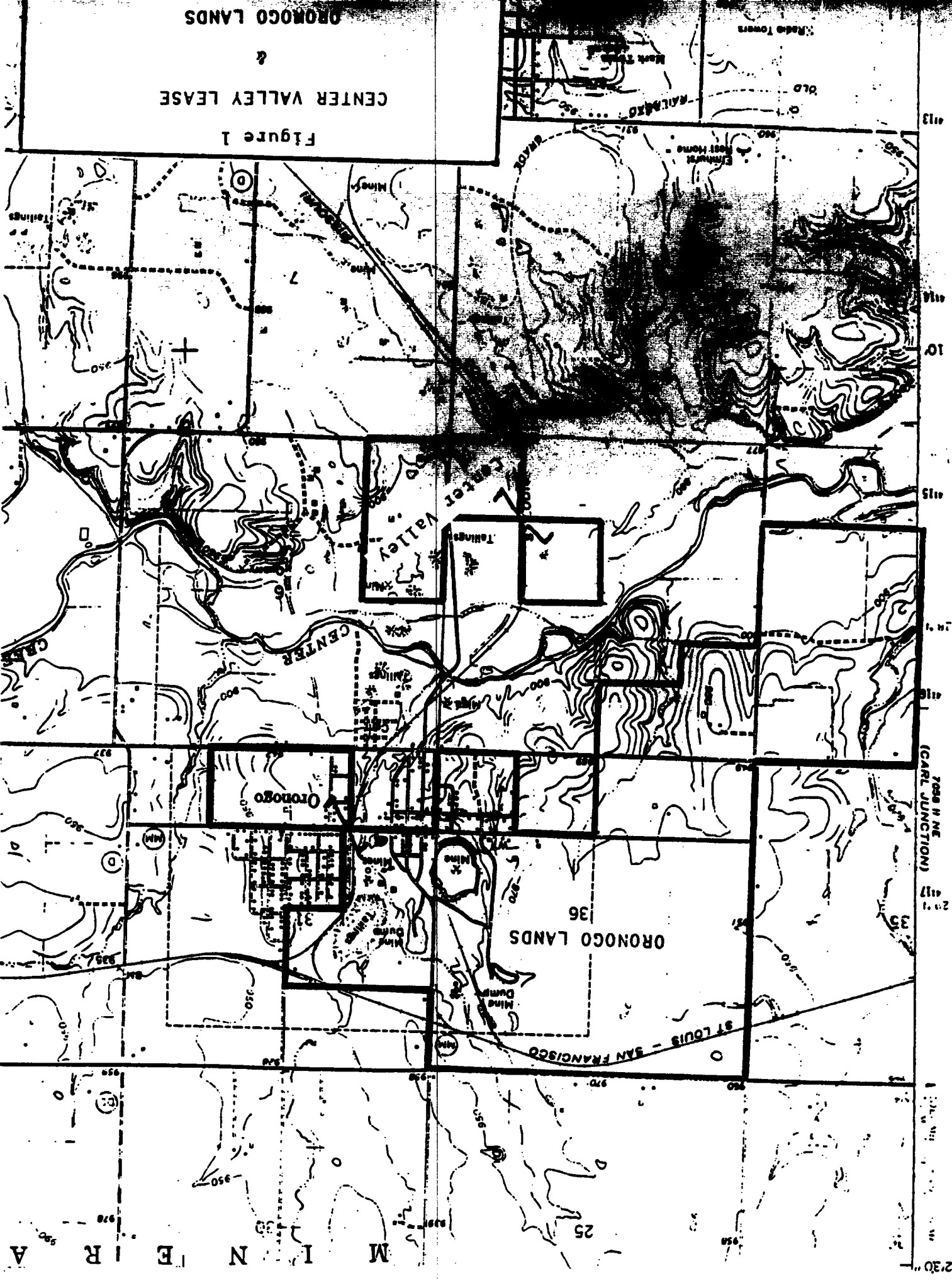
Notes: AZL&S Co. did no mining for its own account.

* All mining ceased at the end of the Premium Price Plan in 1947.

All fee-land and mineral rights sold on Oct. 25, 1974.

END


Daniel R. Stewart
Mining Geologist
November 22, 1985



CENTER VALLEY LEASE

ORONOCO LANDS

Figure 1

M I N E R A

ORONOCO LANDS

Center Valley

ST LOUIS - SAN FRANCISCO

7000 N NE (CARL JUNCTION)

36

25

12'30"

1 2'11"

1 24'

415

10

414

413

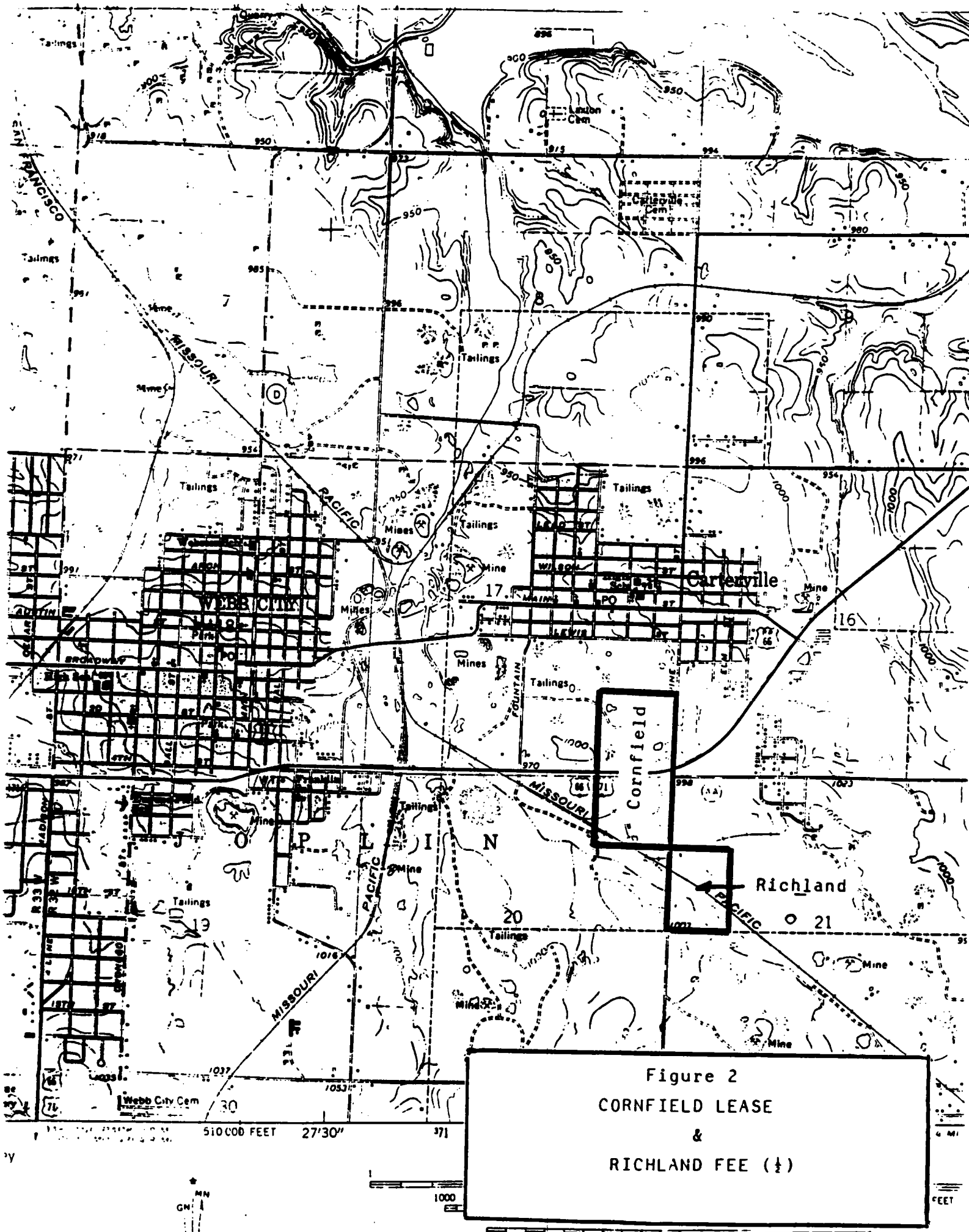


Figure 2
CORNFIELD LEASE
&
RICHLAND FEE (1/2)

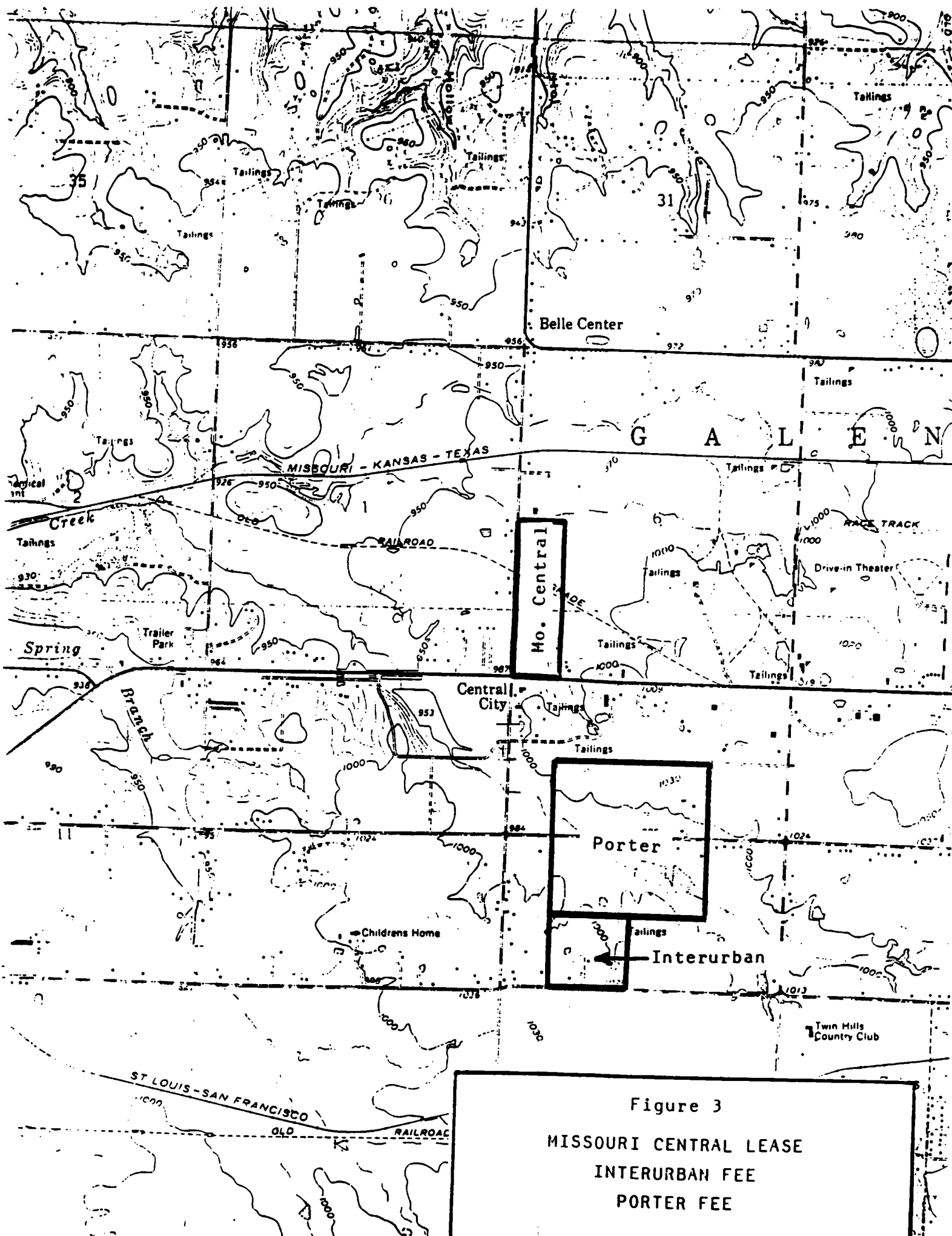
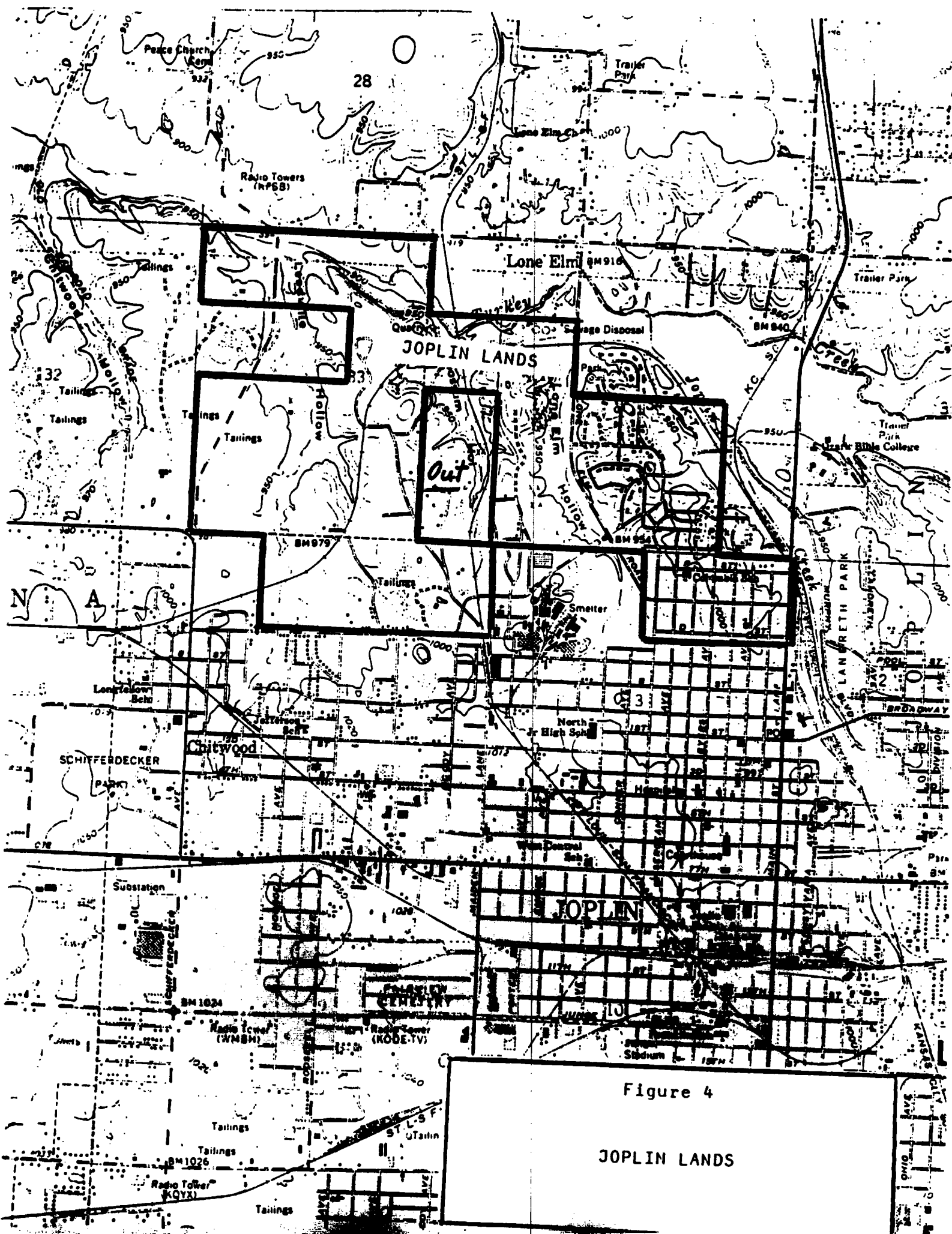


Figure 3

MISSOURI CENTRAL LEASE
INTERURBAN FEE
PORTER FEE



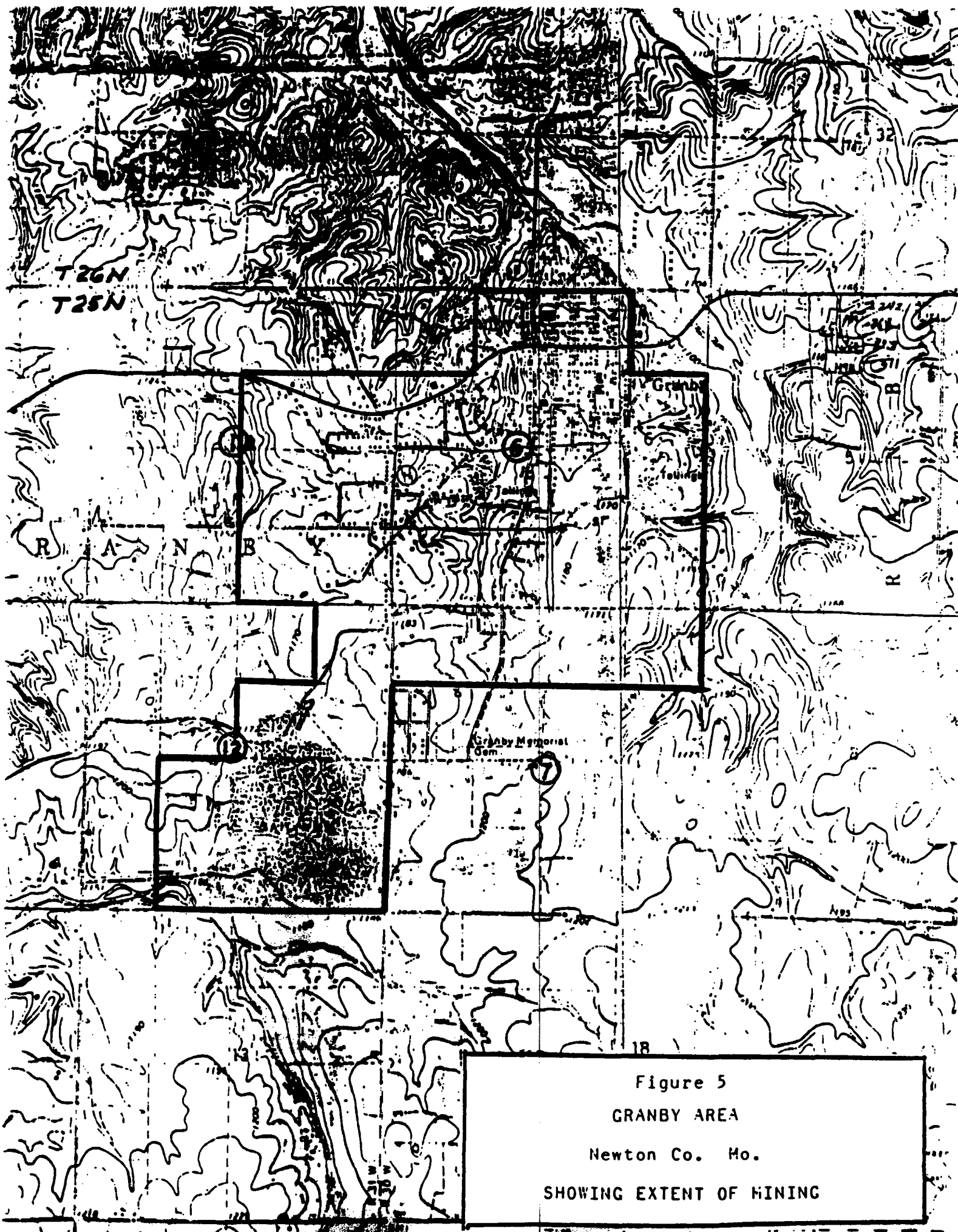


Figure 5

GRANBY AREA

Newton Co. Mo.

SHOWING EXTENT OF MINING

